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THE NATURE CONSERVANCY NEWS

VOLUME 33, NUMBER 4
JULY/AUGUST 1983

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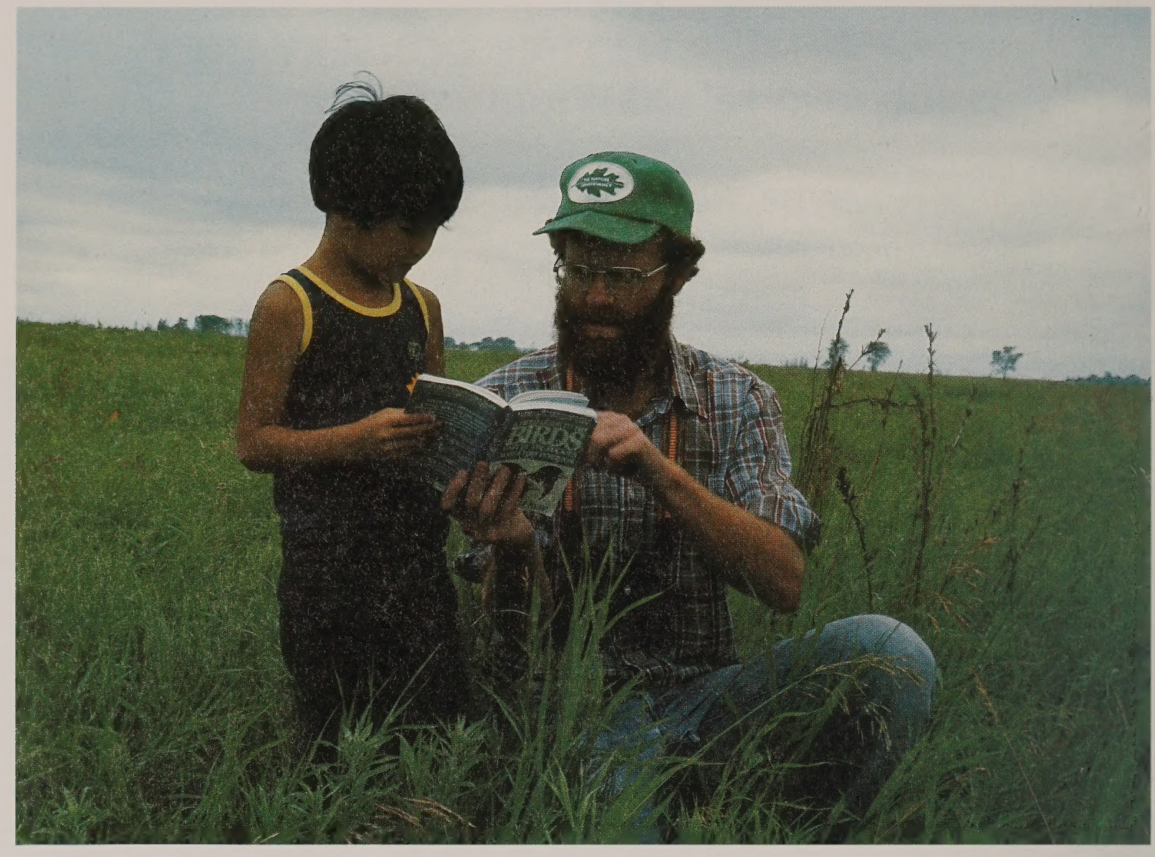
COVER: Biologists Mark Stern and Ginny Rosenberg make transects at the Conservancy's Katharine Ordway Sycan Marsh, Oregon, to assess the status of its grassland communities. The data gathered will aid stewards in monitoring the effects of grazing here as years go by. Photo by Richard Dewey.

The Nature Conservancy is a national conservation organization committed to the preservation of natural diversity by protecting lands containing the best examples of all components of our natural world.

To date the Conservancy and its members have been responsible for the preservation of 2,019,342 acres of forests, marshes, prairies, mountains, and islands: home to rare and endangered species of wildlife and plants. 3,131 projects have been completed since the acquisition of the first preserve in 1954. Approximately 60% of all preserves are retained by the Conservancy and managed by staff and volunteer land stewards.

A membership, non-profit organization, the Conservancy was incorporated in 1951 in the District of Columbia for scientific and educational purposes.

A copy of the last financial report filed with the Department of State may be obtained by writing to: New York State, Department of State, Office of Charities Registration, Albany, New York 12231, or The Nature Conservancy, 1800 North Kent Street, Arlington, Virginia 22209.



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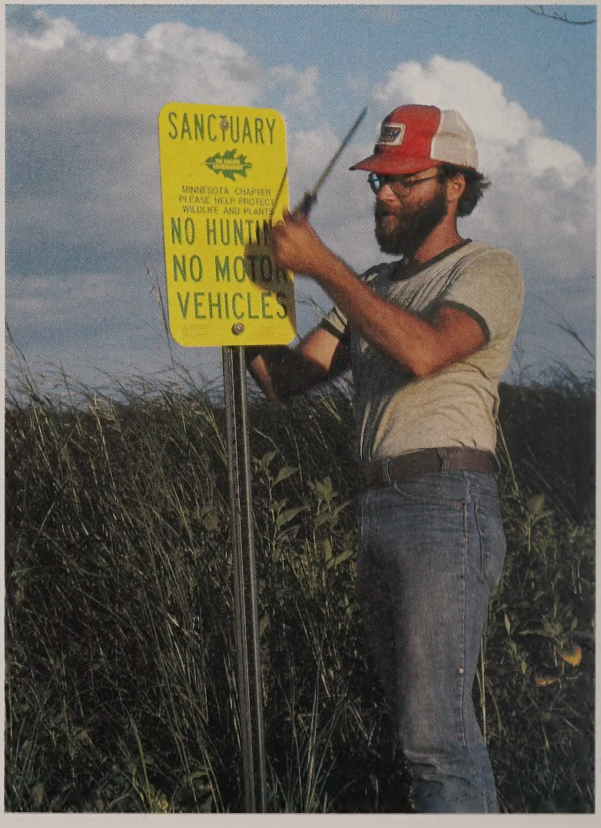


Rick Johnson

President's Letter

IF THE NATURE CONSERVANCY had a litany, it would surely be *"identification, protection, stewardship."* We have long recognized our essential purpose as three-fold: to identify the natural communities and species that are most rare and threatened, and their best remaining locations; to bring them under protection at those locations; and to preserve them indefinitely through careful management of the land.

Identification and protection achievements are discrete, often exciting events. A natural heritage program botanist discovers an orchid —its only known population in the state. A Conservancy field director negotiates a contract to purchase the property on which it grows. Although the story may seem to end there, the stewardship task has just begun.

Unlike discovery of the orchid site, unlike the establishment of protected status for it, stewardship is a continuing and often demanding day-to-day responsibility: an enduring obligation to the site's (and particularly the orchid's) well-being. If we fail in this task, the identification and protection efforts that preceded it have been wasted.

THE CONSERVANCY holds the largest system of privately protected habitats for rare and endangered species and ecosystems in this country and, to our knowledge, in the world. We could not hope to manage these 700 preserves economically and effectively without the 5,000 volunteers who actively participate in land stewardship, working with our fine small corps of professional land stewards. Along with the natural heritage programs and other staff who back them, these volunteers deserve our wholehearted gratitude.

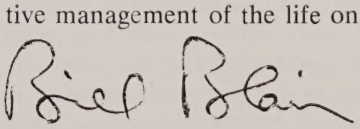
Over three decades, the Conservancy has searched for new and better ways to allocate our growing but still limited resources—to focus our identification and protection efforts, especially, on the rarest, most threatened, and highest quality remnants of the natural world. More recently, we have sought to refine our stewardship objectives and procedures similarly, to give the greatest care to the systems, communities, and species most in need of it.

This concentration on the elements of concern is not meant to imply a feast-or-famine approach to managing Conservancy preserves. We attempt to manage *all* our lands for the general health of their natural systems. We recognize that the targeted elements, whether animals, plants, or communities, are most likely to survive in ecosystems that are healthy. But we can't afford to spend precious time and money on species and systems that are doing well without our help. We need those resources to care for the rare elements that will not endure unless we intervene on their behalf.

Even this is costly. Although we've kept management expenses to a minimum, thanks to the countless work hours donated by our committed volunteers, we spent $4.8 million on stewardship in 1982 alone. This is less than $10 an acre —but with more than 500,000 acres in our care, the total mounts fast. While we try hard to secure an adequate stewardship endowment when funds are raised for a new preserve, inflation and increasingly complex management requirements inexorably are pushing expenses beyond the return on those endowments. The Conservancy must now find new ways to pay for the critical stewardship task.

THIS ISSUE of *The Nature Conservancy News* offers a brief overview of the many activities that collectively make up our stewardship program. The talents, projects, and challenges here described range well beyond our early perceptions of our stewardship responsibilities. The Conservancy has necessarily outgrown the traditional landholder's custodial role and has once again moved into a leadership position in a little-known and difficult field: the management of rare and diminishing remnants of our natural heritage for survival in their natural habitats.

Having previously unified our *identification* and *protection* endeavors around the elements of natural diversity, we now are working to do the same in our *stewardship*. With this discipline and the confidence it brings, we are charting a more precise course toward even more effective management of the life on our lands.



William D. Blair, Jr.

Leslie J. Mehrhoff

Tracking an Elusive Orchid

by John Cook

ON A COLD DAY last January, a meeting at the Conservancy's Eastern Regional Office in Boston began with a roll call.

"Rhode Island: five plants; down seven from last year."

"New Jersey: 30 plants; population seems stable."

"New Hampshire: two new sites located this year!"

The small group of people who attended the meeting is working to save the rarest orchid in eastern North America, the small whorled pogonia. The roll call of every known individual plant seemed to indicate good news and bad news: although it's holding its own or even increasing in northern New England, *Isotria medeoloides* is still declining throughout the rest of its range.

Recently listed for protection under the Endangered Species Act of 1973, *Isotria* has always been, at best, elusive. Since its discovery in 1814, it has been reported to occur at only 45 sites. Some botanists, in the early 1970's, believed it to exist at only four locations. Today there are at least 17 documented sites supporting approximately 600 individuals.

Although a great deal of information has been collected about *Isotria medeoloides*, the data are inconclusive, a factor that frustrates people committed to perpetuating the species. Typically, rare plant field research begins with an assessment of the species' habitats and a search for recurring features at each site, such as soil conditions or tree species. If a pattern can be discerned, it will help in the search for other occurrences of the plant and

may also reveal clues to its proper management.

Gathering even this kind of information for the small whorled pogonia has proven difficult. For example, to visit every known site for the plant, you must travel throughout a geographic area bounded on one side by the Eastern seaboard, by Michigan and Illinois on the west, Georgia on the south, and southern Ontario on the north. In addition, researchers are extremely careful with information on *Isotria*'s locations: widespread distribution of this knowledge could lead to damaging overcollection of the species.

Nonetheless, several thorough studies present the following composite portrait. *Isotria medeoloides* grows in openings in second-growth deciduous woods, sometimes near roadsides, cliffs, or streambeds. It is usually found in populations of only four or five plants and seems to grow best with a relatively open-leaf canopy overhead and with few shrubs or other plants sharing its habitat. One botanist of the 1920's was convinced that beech trees were an essential component of any successful *Isotria* site, but reports from other sites showed no beech trees within miles of the rare orchids. In fact, the small whorled pogonia appears to grow in very ordinary unspecialized habitats and, to further confuse matters, has one look-alike relative (*Isotria verticillata*) and bears a strong resemblance to a non-relative: common Indian cucumber-root (*Medeola virginiana*).

Although the author of an often-quoted 1950 publication claims that the orchid can remain dormant for up to 20 years and then reappear, there are today no known instances of this phenomenon, and the theory is now generally discounted. One factor that seems consistently to affect the health of specific populations is the amount of available light. A trend appears to exist throughout *Isotria*'s range: the healthiest occurrences are found in areas of past disturbance where a forest has returned. As the surrounding trees mature and grow, they apparently provide too much shade—and the orchids decline in number and overall vigor. In fact, some botanists believe that the gypsy moth defoliations of New England forests have helped improve the health of *Isotria medeoloides* populations.

As botanists have continued their research into the ecology and reproductive biology of the small whorled pogonia, a conviction has deepened: simply protecting the plant's sites would not be sufficient to preserve the species. If the orchid were to survive, decisions would have to be made about habitat maintenance. And no single individual could keep track of all the sites in order to make such decisions.

EARLY IN 1982, The Nature Conservancy's stewardship department determined that it could contribute significantly to the expanding protection effort for *Isotria,* especially in maintaining an annual status check on each of the 17 sites in 12 states and Canada. Although many botanists know specific details of the orchid's biology, no university, government agency, or other conservation organization is as well prepared as the Conservancy to efficiently gather necessary field information throughout the plant's range.

A two-year trial study was organized for 1982-83. Funds were provided by a small grant from the Conservancy's Rodney Johnson Stewardship Endowment, which was matched by a private gift. Based on formats proven successful by the natural heritage programs, a standard field research questionnaire was provided to botanists familiar with each known *Isotria* site. The primary purpose of the questionnaires is to establish an annual field check of every *Isotria* location during every growing season. Furthermore, the information gleaned will be of help to the people responsible for adequately managing the orchid's sites.

IN THAT JANUARY MEETING, which was attended by botanists from the U.S. Fish and Wildlife Service and the New England Natural Heritage Program, the Conservancy's stewardship staff members had a look at the first results of its study. Field survey forms had been returned from 11 known sites; a higher response is expected in 1983. Although one year's results are inconclusive, *Isotria medeoloides* appears to be staging a comeback in northern New England.

It is ironic that while more individual plants are known to exist today (when compared with past documentations), only three sites account for this fact: each has over 100 of the orchids. Thus, most of the remaining sites appear to have stable or declining populations. Management-activity discussions now focus on the possibility of carefully thinning the treetop canopy (to permit more light) at a site where *Isotria* is known to be declining. As plans for the recovery of this endangered species near completion, the information gathered annually, site by site, will help determine what steps, if any, should be taken to manage the few locations that support countable remnants of the East's rarest orchid.

John Cook is director of stewardship for the Conservancy's Eastern Regional Office.

The Case of the Missing Disturbances

by Allen A. Steuter

Thomas Arter

Grassland fires, proscribed in the Midwest by settlers, are prescribed today by stewards. Controlled burning on a number of Conservancy prairies has enhanced species diversity and checked the spread of exotics.

THE NATURAL COMMUNITIES that welcomed pioneers to America's Midwest were relatively young. The geological record shows us that the plant and animal constituents, and the landscape itself, had undergone many "recent" changes. In fact, our current understanding is that the organization of the vast prairie types of the central United States developed since the last ice age, 10,000 to 20,000 years before settlement times. The climate had become warmer and drier, creating a survival advantage for grasses and other herbs at the expense of woody plants. This change reduced the region's diverse megafauna (which included mammoths, sloths, and horses) by edging out browsers, who depended upon the woody plants for nourishment. Grazers, on the other hand, flourished—most notably, and in increasingly large numbers, bison and antelope.

The Indian ancestor also existed in this changing environment, and he had a tool he'd learned to use quite well during the preceding millenia.

Al Steuter

Paul Bultsma

Long gone are America's large, free-ranging bison herds—but carefully managed rotational grazing by these native animals (pictured at the Conservancy's Samuel H. Ordway, Jr., Memorial Prairie in South Dakota) continues to promote the vigor of grassland preserves.

The tool was fire, which along with lightning regularly set the prairies ablaze. Then the first French trappers arrived on the prairies, followed by settlers in force. They created another set of changes to which the region's plant and animal communities had to adapt. First of all, because fires—or "wildfires" as they were called—were considered dangerous, they were quickly subdued. Second, the intensive but periodic grazing of free-ranging bison and antelope was replaced by the continuous grazing of cattle or sheep, which were confined to the same pastures year after year. Many of the remaining prairie tracts were soon islanded among croplands. In short, fire and grazing ceased to play their historic roles in the natural system.

It might be said that a piece of land from which these prairie "processes" have been banished is no more an example of a prairie than a stuffed museum animal is an example of the living species it represents. Today, conservationists committed to preserving a prairie's natural character sometimes find it necessary to reintroduce fire or grazing or both. The challenge is to manage these "disturbances" in a way that is ecologically sensitive.

THE NATURE CONSERVANCY, along with other conservation groups, often employs burning in its prairie domain in an attempt to preserve species diversity. Using fire—at a particular time, in a particular place, under controlled conditions—to accomplish specific biological or resource objectives is called prescribed burning. It should be conducted only by experienced personnel after careful review of a documented prescribed burning plan. Such a plan specifies wind speed and wind direction, relative humidity, temperature, and condition of the vegetation to be burned—the physical factors that must be regulated during a burn. The use of grazing as an active management technique can also work to enhance diversity. The Conservancy's Samuel H. Ordway, Jr., Memorial Prairie—a 7,600-acre preserve in the prairie pothole/mixed grassland of north-central South Dakota—offers a model for both grazing and burning.

Bison or cattle graze on about 80 percent of the preserve. With the exception of two areas that are set apart for comparison, the prairie is grazed during the growing season for only one six-week period or less. There are long lapses between grazing periods in which the plants can restore

their vigor, yet the grazing does serve to remove some of the annual growth. Much as the great bison herds of the past roved from one part of their range to another, thereby rotating its use, the animals at Ordway are moved from pasture to pasture. Rotational grazing aids in the cycling of nutrients (through cow dung and old growth being trampled into the ground) and maintains prairie plants in a productive state. Because the bison and cattle choose to eat different plants at different times of year, certain plants are favored in the short term. But as the grazing rotates from year to year, no single group of plants is constantly suppressed, and the community gains in variety and richness.

Prescribed burning is used at Ordway Prairie in the spring to control most of the undesirable exotic plants such as Kentucky bluegrass, smooth brome, and wormwood sage. If rains have been plentiful in the course of the year, the preserve's productive loamy soils foster a dense growth of grasses and forbs. Areas that have been lightly grazed, or grazed not at all, rapidly accumulate litter. Because it shades prairie plants, litter—or old growth—reduces sunlight and soil temperature and, thus, alters species composition. (Most prairie flora thrives on light and warm moist soils.) Fire rejuvenates these areas by removing litter.

Mark Heitlinger

The Conservancy combats invading red cedars at its Ottawa Bluffs Preserve in Minnesota; without prescribed burning, the prairie would soon succeed to woodland.

A DIFFERENT MODEL of grassland management is presented by the Conservancy's 30-acre Ottawa Bluffs Preserve in the Minnesota River breaks near St. Peter, Minnesota. Aerial photographs taken at intervals from 1940 on provide a graphic demonstration of what can happen to a native prairie community when left "undisturbed." Over the years, eastern red cedars have been invading the small prairie openings native to Ottawa Bluffs—threatening the grassland with succession to woodland. A few years ago, the Conservancy's Minnesota Chapter began spring burning to kill the young cedars and to prune back the larger cedars. While the young red cedars are easily controlled with a single fire, the larger plants, which grew up before the advent of prescribed burning, are tougher to remove. An initial fire takes the lower branches, letting in more light and improving soil conditions for the growth of grasses under the canopy. These very grasses, in their dried-out spring state, fuel the flames of successive fires that gradually put an end to the older cedars.

Kentucky bluegrass is another plant that detracts from the native character of Ottawa Bluffs' prairie communities. It is a non-native cool-season grass—an unwelcome addition to the native tallgrass prairie—that was brought along by European settlers. Prescribed burning in the spring, after Kentucky bluegrass begins greening up, is an effective means of reducing the exotic species while nurturing the native flora. Although the sandy, erodable soils of Ottawa Bluffs receive an average of 28 inches of precipitation a year, they are less productive than many of the other prairie soils in Minnesota. As a result, litter builds up slowly, so that a relatively long interval (three to five years) can elapse between burnings once the red cedar and bluegrass are under control. Until then, annual or biennial spring burning is recommended.

The Nature Conservancy's stewardship program generally works to *prevent* disturbances on its preserves; yet there are cases in which a "disturbance" can be invaluable to the health of a natural community. By using carefully controlled, well-planned burning and grazing on its prairie preserves, the Conservancy is replicating the historic interaction of two natural forces to maintain complete living examples of our grassland communities.

Allen A. Steuter is the research and management associate at the Conservancy's Samuel H. Ordway, Jr., Memorial Prairie in South Dakota.

Merlin D. Tuttle/Bat Conservation International

Gray bats stir from winter stillness in Tennessee's Hubbard's Cave, a Conservancy preserve.

Stewardship Goes Underground

by Anne M. Byers
Senior Editor

THOUSANDS OF BATS are suspended from the cavern's dome-shaped roof. Below the roost is a large pool populated by scores of almost-white crayfish, easily seen through the translucent water. Along with a few giant bullfrogs, the crustaceans congregate directly beneath the bats, ready to devour young that sometimes fall into the lake. Other predators such as rat snakes, owls, hawks, pack rats, and raccoons concentrate in surprising numbers around the cave's entrance, catching bats as they come and go.

Containing what is probably the largest bat colony on the Florida Panhandle, Marianna Bat Cave is also the *only* cave in the state still used as a nursery site by the federally endangered gray bat. It harbors some 10,000 gray bats and 90,000 other bats. Because the cave is essential to the survival of Florida's gray bat population, it was jointly purchased by The Nature Conservancy—through its Florida Chapter—and the state's Game and Fresh Water Fish Commission.

Certain wild caves are of special concern to the Conservancy, particularly those that serve as hibernacula and as nurseries for North America's diverse and increasingly scarce bat species. (Of the 40 different bats documented in the U.S., most are insectivorous cave dwellers.) And many unaltered caves ensure the survival of a variety of other creatures, some occurring nowhere else in the world. Because caves continue to be sealed off, vandalized, polluted, commercially developed, or simply destroyed as human populations expand, the few remaining wild caverns must be preserved.

GENERAL DAVIS, a West Virginia cave system half a mile deep, is currently safeguarded through a donated conservation easement on the entire system and a one-acre gift of land that contains both known cave entrances. Because of its rare fauna (including wintering populations of endangered Indiana bats), it is ranked by scientists to be among the most biologically significant caverns in the entire Appalachian Region.

To protect critical habitat inside, a gate has been placed within General Davis Cave. It was jointly erected by the Conservancy's West Virginia

John R. MacGregor

Field Office, the Virginia Region of the National Speleological Society, and the Cave Conservancy of the Virginias. Continued unobstructed passage of the cave's bats was the greatest concern in designing the barrier, and it may be removed or redesigned if it is found to hinder the animals' flight.

On the other hand, no grating will be placed at the opening of Florida's Marianna Cave, which houses maternity colonies of gray bats. Here, bats emerge and return daily over a period of weeks or months each year, thereby attracting numerous snakes and other predators to the entrance. Any type of barrier slows the bats, making them far more vulnerable. (Young bats just learning to fly are especially easy prey.) It also serves as an ideal perch for the waiting predators. Gray bats *can* tolerate gates at hibernating caves, but only if the barriers do not interfere with crucial air flow.

Gates, fences, signs, and regulations are essential to managing ecologically significant wild caves. Generally, the methods used are determined by the rarity and diversity of a cave's fauna (and the creatures' needs) and by the cave's location. A cave in a very remote area, for example, may require no more than a sign. More specifically, gating to protect cave-dwelling bats from human disturbance, particularly vandalism, depends on certain carefully weighed conditions: the size of the cave's entrance, air-flow patterns, the bat species using the cave, and whether the cavern is a hibernaculum or a nursery.

Don Russell

Top: Hibernating Indiana bats, lodged in a cave crevice. At the Conservancy's General Davis Cave in West Virginia, a gate shields the endangered mammals from intruders throughout their winter stay. Above: the endangered gray bat, whose only nursery cave in Florida (Marianna) has been protected by the Conservancy in cooperation with the state.

Management plans for Tennessee's Hubbard's Cave currently call for a fence and a sign. The sign will explain why the cave section containing hibernating bats is closed and will ask that cavers confine their explorations to other passages. Optioned for purchase by the Conservancy, which is receiving fund-raising assistance from the Nashville Grotto of the National Speleological Society, Hubbard's is one of the three most important bat hibernacula in North America. Indiana bats, gray bats, and six other species of migratory and nonmigratory bats over-winter in the cave's closed passages.

ALSO OWNED by the Conservancy, Charley Owl Cave in Oklahoma supports one of the state's largest colonies of gray bats—the population fluctuates between 5,000 and 10,000 and is increasing. Hibernating western big-eared bats use the cave as well. It is in the summer that Charley Owl is used by maternal gray bats. Consequently, visitors are asked to obtain permission to enter the cave, and explorations are restricted to winter months.

The food chain formed by the guano base in Charley Owl Cave supports a variety of other cave fauna: dark-sided, slimy, and cave salamanders; several species of crustaceans, arthropods, isopods, and spiders; two species of crickets, and other insects. Charley Owl's volunteer manager, biologist Don Russell, was able to study all stages of the Ozark cave web-worm (it previously had been known only in its larval form) because the cave's abundant guano generates the insect life on which the web-worm feeds.

Wisconsin's Bear Creek Cave, which the Conservancy transferred to the University of Wisconsin to be managed by the University's Zoological Museum, is currently the site of a very different type of research. The cave had no natural or manmade entrance until 1954, when a small nearby quarrying operation accidently created an opening in the unknown cavern. Thus, it has been available for animal habitation for only 29 years. It is an ideal arena for observing the invasion of cave-related fauna. One of the few undisturbed caves remaining in the state, its unique formations are still intact. Because Bear Creek Cave is used strictly for research, it is closed to the general public; the Wisconsin Chapter of the National Speleological Society helps monitor it.

ACQUIRED BY the Conservancy in 1967, Ezell's Cave in Texas is probably one of the organization's most thoroughly inventoried caves. Within two lake-bottomed rooms coexist shrimp and snails, millipedes and centipedes, amphipods and isopods, cockroaches and crickets. A study conducted from January 1978 to March 1979 found and recorded a total of 98 kinds of animals in the cave; 38 of these are cave-adapted or cave-related. The best known is the Texas blind salamander, an endangered amphibian that occurs only in the San Marcos Pool of the Edwards aquifer, which feeds the waters of the dual-chambered cavern. It is the most highly cave-adapted salamander and was sighted on 32 occasions during the '78-'79 study.

Allan B. Cobb

Restricted in range to a small portion of central Texas, the nationally endangered Texas blind salamander prospers in the dark of dual-chambered Ezell's Cave, a Conservancy preserve near San Marcos.

Unfortunately, the cavern's entrance was sealed in from 1955 to '67. Bats using Ezell's have not returned, despite an effort in 1970 to recolonize the cave with some 200 bats. Guano was also transported to the cave on several occasions in an attempt to restore the presumed energy cycle.

Ezell's Cave exists in a very urban area—San Marcos. Despite a high fence topped by barbed wire and a padlocked gate, vandals continue to be a major problem in protecting this unique cavern. A properly designed gate has recently been erected in the cave's entrance.

The caves featured in this article all harbor unusual forms of life that must be protected and appropriately managed to ensure their survival. Since safeguarding them is the Conservancy's objective and occupation, access to all or parts of these caverns is regulated or restricted. The Conservancy greatly appreciates the assistance of various caving organizations in caring for these underground treasures.

Preserve Management: A Collage

The management of Conservancy preserves takes as many forms as the life and land it serves. Volunteer committees guide stewardship at a number of our sanctuaries, while some are managed by full-time staffs. Boardwalks are built to spare bogs—and gates to guard bats—on certain preserves, while structures are expeditiously removed from others. Caring for the land we save demands much more than vigilance: it often requires the active manipulation of habitat for the survival of a species or community—the dredging of a watercourse, the burning of a prairie. The following pictures offer a glance at management practices that are not described elsewhere in these pages. If space allowed, we'd feature many more.

Barry Spicer

Seining in Redfield Canyon at Arizona's Muleshoe Ranch, a 51,380-acre Conservancy preserve in the Galiuro Mountains. Zoologist Scott Mills (left) and biologist Doug Koppinger (right) of the state natural heritage program are taking inventory of the area's rare Gila chub and other significant fish species. Biological monitoring of this kind enables preserve stewards to check and recheck the condition of resident populations and to assess management practices bearing upon them.

Richard Dewey

Coring a vintage Douglas fir in the Conservancy's Northern California Coast Range Preserve to trace the area's fire history. Preserve stewardship is a joint undertaking—combining the skills and efforts of volunteers (like those pictured here), researchers, scientists, and staff members on the local, state, regional, and national levels. Each of these groups contributes substantially to the management of our sanctuary system.

Terry Ring

Catch-and-release fishing in the spring-fed waters of the Conservancy's Silver Creek Preserve southeast of Sun Valley, Idaho. Preserve stewards allow a wide range of compatible activities on most Conservancy preserves—recreation in many forms, haying, grazing, research, education. . . . Their overriding management consideration is the well-being of those "elements of natural diversity" (species and biological communities) that the preserve was established to protect.

1983 Annual Meeting and Conference
The Nature Conservancy
Tucson, Arizona
October 19-23

Official Notice

Notice is hereby given to the members of The Nature Conservancy that, pursuant to Article VII, Section 2, of the Bylaws of The Nature Conservancy, 1980 revision, a membership meeting will be held at the Doubletree Hotel, Tucson, Arizona, at 10:15 a.m. on October 22, 1983, for the purpose of receiving reports, electing officers and governors of The Nature Conservancy for the ensuing year, and acting on such other business that may come before the meeting.

Please note the official ballot on the next page.
It should be signed and returned as described therein.

William D. Blair, Jr., President

Official Ballot

☐ I cast my vote for the slate of officers and governors proposed by the nominating committee.

Name (please print) _____

Address _____

_____

Signature _____

A valid ballot can be executed only by a member in good standing. Return signed ballot to: Assistant Secretary, The Nature Conservancy, 1800 N. Kent Street, Arlington, Virginia 22209. To allow sufficient time for processing, ballots should be received by October 10, 1983.

☐ Please send me a complete registration and information packet for The Nature Conservancy's 1983 Annual Meeting and Conference.

Proposed by the Nominating Committee

NOMINATED AS OFFICERS

Charles J. Hedlund, New Jersey, current member, former vice chairman, is nominated as chairman. Former president, Esso Middle East, and former vice president, Exxon Corporation; chairman, international advisory committee, The Nature Conservancy; member, corporate relations committee, The Nature Conservancy; chairman, board of trustees, American University in Cairo; trustee, American Museum of Natural History, New York.

J. C. Brenton, Iowa, current treasurer, is nominated as vice chairman. Executive vice president and treasurer, Brenton Banks, Inc.; member, corporate relations committee, The Nature Conservancy; president, Iowa Chapter, The Nature Conservancy.

Jane N. Page (Mrs. Walter H.), New York, current vice chairman, is renominated. Board of trustees, Pierpont Morgan Library; vice chairman, board of trustees, Robert College of Istanbul, Turkey; secretary and former chairman, Long Island Chapter, The Nature Conservancy.

S. Bruce Smart, Jr., Connecticut, current member, is nominated as vice chairman. Chief executive officer and chairman of the board, The Continental Group, Inc.; director, Chase Manhattan Bank (N.A.), Chase Manhattan Corporation, Celanese Corporation, G.T.E. Corporation, and The Life Insurance Company of Virginia; vice chairman, board of trustees, Smith College; trustee, American Enterprise Institute; chairman, annual giving campaign, Council on Foreign Relations; member, the Conference Board, the Business Roundtable, the Business Council, and corporate relations committee, The Nature Conservancy.

Kenneth E. Hill, California, current member, is nominated as treasurer. Consultant, Blyth, Eastman, Payne, Webber; former vice president in charge of petroleum activities, Chase Manhattan Bank; former executive vice president, Blyth, Eastman, Dillon & Company; director, Standard Oil Company of California; member, corporate relations committee, The Nature Conservancy; trustee, California Chapter, The Nature Conservancy.

David L. Harrison, Colorado, current secretary, is renominated. Partner, law firm of Moses, Wittemyer, Harrison and Woodruff, Boulder; former chairman, Colorado Chapter, The Nature Conservancy; co-author of articles on water use and land planning; member, Colorado and American Bar Associations; Oak Leaf Award, The Nature Conservancy, 1978.

NOMINATED AS MEMBERS

***Kenneth L. Albrecht,** New Jersey. Vice president, Equitable Life Assurance Society; board of directors, Independent Sector; board of directors, Council on Foundations; former chairman and trustee, National Council on Philanthropy.

***Charles M. Deaton,** Mississippi. Attorney, law firm of Brewer, Deaton & Bowman; former chairman, appropriations committee, Mississippi House of Representatives; former chairman, Mississippi Wildlife Heritage Committee; senior aide, Governor Winter's staff, areas of economic development, transportation and natural resources; member, Mississippi Board of Economic Development, and Mississippi and American Bar Associations; board of directors, Bank of Commerce, Greenwood, Mississippi.

***Cathleen H. Douglas,** Washington. Partner, law firm of Leva, Hawes, Symington, Martin and Oppenheimer; director, Best Products Co., Inc.; member, District of Columbia, Washington, Federal and American Bar Associations, and editorial advisory board of the *Banking Law Journal.*

***Noel Lee "Skip" Dunn,** North Carolina, current vice chairman. Partner, Pilot Insurance Agency; trustee emeritus, Ducks Unlimited; past chairman, board of trustees, Izaak Walton League of America; member, board of directors, National Audubon Society; trustee, Forsyth County Nature Science Center; chairman, steering committee, North Carolina School of the Arts; director, Southeastern Center for Contemporary Art; chairman, Awards in the Visual Arts (AVA).

Daniel J. Evans, Washington. President, The Evergreen State College; former governor, State of Washington; trustee, Washington Mutual Savings Bank, and National Academy of Public Administration. Director: Enterprises International, Inc.; Unigard Insurance Group; Continental, Inc.; and The Urban Institute. Chairman, Skagit eagle campaign, The Nature Conservancy; Pacific Northwest Power Council.

***Jane Martin,** Tennessee. President, Jane Martin and Associates, Inc.; writer-reporter; civil engineer; member, Nashville Board of Alive-Hospice, and State of Tennessee 208 Advisory Committee for Non-Point Water Pollution Control; trustee, Tennessee Chapter, The Nature Conservancy; Oak Leaf Award, The Nature Conservancy, 1979.

Clifford F. Messinger, Wisconsin. Chairman, Oven Systems, Inc.; director, Planned Parenthood of Wisconsin; former director, St. Luke's Hospital, and Wisconsin Humane Society; former trustee, Northland College; trustee and chairman of development committee, Wisconsin Chapter, The Nature Conservancy.

***Donal C. O'Brien, Jr.,** Connecticut, current vice chairman. Partner, law firm of Milbank, Tweed, Hadley & McCloy; chief legal counsel for the Rockefeller Family and Associates; former commissioner of the Connecticut State Board of Fisheries and Game, and Connecticut Council of Environmental Quality; chairman-elect, board of directors, National Audubon Society; trustee, Greenacre Foundation; member, board of directors, American Museum of Natural History, Shelburne Museum, and the International Atlantic Salmon Foundation; chairman, board of directors, Quebec-Labrador Foundation.

Leonard L. Silverstein, Maryland. Partner, law firm of Silverstein and Mullens; Associate Professor of Law, Georgetown University; chief editor, *Tax Management Inc.;* member, District of Columbia and American Bar Associations, and President's Committee on Arts and Humanities, chairman, Tax Working Group; president, National Symphony Orchestra; trustee, Corcoran Gallery of Art; member, International Fiscal Association.

Peter W. Stroh, Michigan. Chairman and chief executive officer, The Stroh Brewery Company; former chairman, United States Brewers Association. Director: N.B.D. Bancorp, Inc.; Detroit Renaissance; Detroit Economic Growth Corporation, The International Atlantic Salmon Foundation. Trustee, Detroit Medical Center Corporation, Children's Hospital of Michigan, and McGregor Fund; trustee and member of advisory board. Michigan Chapter, The Nature Conservancy.

Jean Vollum (Mrs. Howard), Oregon. Board member, Oregon School of Arts and Crafts, St. Vincents Hospital, St. Vincents Hospital Foundation, and Tektronix Foundation; trustee, Carlin School; member of various national and local environmental organizations.

(over)

*__Mason Walsh, Jr.,__ Pennsylvania, current chairman. Senior vice president and general counsel, Richard K. Mellon and Sons; trustee, Richard King Mellon Foundation, R. K. Mellon Family Foundation, and various Mellon family trusts; vice president and trustee, Children's Hospital of Pittsburgh; trustee, Western Pennsylvania Conservancy; trustee, Alabama Coastal Land Trust. Member: advisory committee, Wildlife-Wildlands Institute, Missoula, Montana; and corporate relations committee, The Nature Conservancy.

*__Thomas Robert Wilcox,__ California. Chairman of the executive committee, Crocker National Bank and Corporation; retired chairman and chief executive officer, Crocker National Bank and Corporation; retired vice chairman and director, Citicorp; former vice chairman and director, Blyth, Eastman, Dillon & Co. Inc.; director, Midland Bank plc, Colgate-Palmolive Company, and Hilton Hotels Corporation. Trustee: Mutual Life Insurance Company, New York; California Nature Conservancy; and Marine Historical Association, Mystic, Connecticut. Director, Conrad N. Hilton, and W. M. Keck Foundations.

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*Current member renominated

Tentative Schedule

Wednesday, October 19

Registration and Hospitality Corner
Exhibits and Bookstore

Special Screening of "Another Day"
Grace Flandrau Planetarium

Thursday, October 20

All-day Field Trips
- Kitt Peak National Observatory and San Xavier Mission
- Mount Lemmon
- Canelo Hills Cienega and Patagonia-Sonoita Creek
- Casa Grande Ruins National Monument and Boyce Thompson Southwestern Arboretum
- The Mile Hi and Ramsey Canyon Preserve
- Tombstone National Historic Site and The Mile Hi
- Chiricahua National Monument
- Archaeological Trip

Friday, October 21

Morning in the Desert
Arizona-Sonora Desert Museum

Open Board of Governors Committee Meetings

Seminars
- Water Problems
- Heritage Programs

Idea Exchange Luncheon

Evening in a Cottonwood Grove
Tanque Verde Guest Ranch

Saturday, October 22

Annual Meeting and President's Report

Afternoon Field Trips
- Sabino Canyon
- Madera Canyon
- Oracle Wildlife Refuge
- Historic Tucson Tour
- Archeological Trip
- Saguaro National Monument

Premiere, "Garden of Eden"

Reception and Annual Awards Banquet

Sunday, October 23

All-Day Field Trips
- Kitt Peak National Observatory and San Xavier Mission
- Mount Lemmon
- Canelo Hills Cienega and Patagonia-Sonoita Creek
- Casa Grande Ruins National Monument and Boyce Thompson Southwestern Arboretum
- The Mile Hi and Ramsey Canyon Preserve
- The Amerind Foundation and The Mile Hi
- Chiricahua National Monument
- Archaeological Trip

Alison DesMeules

Seed sowing at the Conservancy's Silvermine Fern Colony Preserve in western Vermont. In order to avert the degradation of the six-acre rare plant site—a "frost hole" or cold-air basin surrounded by heavily timbered terrain—Marc DesMeules of the Vermont Field Office is temporarily stabilizing the soils of adjacent logging roads with a fast-growing cover crop. Without such management practices, the bowl of land and its vigorous colony of regionally rare ferns (Dryopteris filix-mas *and* Dryopteris filix-mas *x* marginalis) *would be subject to the effects of erosion—siltation foremost among them.*

Mitchell Byrd

New Homes in Old Habitats

by Mitchell A. Byrd and Karen Terwilliger

THE CONTINUED EXISTENCE of some threatened or endangered animals is dependent on reestablishing those species in areas where they no longer occur. The whooping crane and the bald eagle, Kemp's ridley sea turtle and Eastern indigo snake, the Houston toad and the Utah prairie dog—all are presently being reintroduced into some part of their historical ranges in an effort to increase their chances of survival.

Typically, it is the responsibility of a recovery team (appointed by the U.S. Fish and Wildlife Service and composed of members from various agencies) to determine a suitable plan for preserving a species once it has been officially designated as endangered. A recovery plan may address anything from habitat acquisition and management to public relations. For a species whose population has been completely extirpated from part of its range, the plan may recommend reintroducing the species by taking individuals from a population elsewhere or from a captive group.

Breeding populations of two endangered animals have apparently disappeared from Virginia: the peregrine falcon and the Delmarva Peninsula fox squirrel. The recovery plan for the peregrine advises reintroduction of captive-bred falcons. Recommendations for the fox squirrel, meanwhile, call for translocating individuals from healthy existing populations.

Given the habitat requirements of the peregrine and the fox squirrel, The Nature Conservancy's Virginia Coast Reserve (VCR) was found to be an ideal place to reestablish them. The 35,000-acre reserve embraces most of a 50-mile stretch of barrier islands and associated marshes on the Eastern Shore of Virginia. Both reintroduction

Mitchell Byrd

Greg Greer

Left: thirty-foot-high peregrine release tower—with released peregrines—on Cobb Island at the Conservancy's 35,000-acre Virginia Coast Reserve. Reintroduction of the captive-bred raptors began in 1978. Above: peregrine chicks, less than a month old, are ensconced on high in closed "hack boxes" and fed through a chute for two weeks before fledging. Right: one of the first reintroduced falcons hatched in Virginia is banded for identification before its test flight.

programs are cooperative efforts of the Conservancy, the non-game program of the Virginia Commission of Game and Inland Fisheries, the U.S. Fish and Wildlife Service, Cornell University, and the College of William and Mary.

IT IS BELIEVED that the peregrine falcon population in the Eastern United States originally consisted of an estimated 350 breeding pairs. The population declined greatly during the 1950's; by the mid-60's, no known breeding pairs existed east of the Mississippi River. Like the bald eagle, the peregrine's reproductive success diminished because of the effects of pesticides on eggshell thickness.

There is little evidence to suggest that the peregrine falcon was ever abundant in Virginia. Recent studies conducted at the College of William and Mary have revealed 21 known historical nesting sites in the state, 19 of which were located in the Appalachian Mountains, two in coastal locations where the falcons used abandoned osprey nests.

The program to reintroduce peregrines into the Commonwealth was begun in 1978 on Cobb Island in the VCR chain. It and other subsequently used barrier-island sites were chosen because they usually have no great horned owls, raccoons, or other predators of young falcons. All released birds have come from Cornell University's highly successful captive-breeding program, the Peregrine Fund. Each of the release sites on Cobb Island and elsewhere bears a 30-foot tower topped with a large platform and a 4- by 5- by 3-foot box. Called a hack box, the structure has a removable front constructed of closely spaced bars that permit confined falcons to see the surrounding terrain.

Releases begin by placing groups of 5 to 7 captive-reared falcons, 28 to 30 days old, in the hack box. Covered with down and just a few emerging feathers, the chicks usually have been fed by adult peregrines at Cornell's propagation facility, so they have appropriately imprinted on their own species. Human attendants feed the enclosed young birds through a chute atop the hack box until they are 42 to 45 days of age. Then the box's facade is removed, and the fledglings are free.

First flights and landings are often awkward—as are the results. In 1981, at the Cobb Island release site, a young peregrine freed the previous year appeared and frightened the new resident fledglings into a premature flight from the tower. One of the young birds splashed down in the

Doug Davis

A newly fledged peregrine exercises its wings.

ocean, and the graduate student attendant had to take a cold swim. A second falcon alighted in a nearby osprey nest and narrowly missed injury from its enraged occupant.

During the first few critical days of practice flying, the peregrines are watched carefully; attendants must know where they are at all times. Over the next several weeks, the falcons' flying skills steadily improve. Soon they are chasing each other, as well as any other birds cruising too near the tower. Gradually, their flights become polished and precise. Throughout this period, food is left on the tower platform until the peregrines become independent and disperse, normally in about four weeks. The peregrine falcon reintroduction program is founded on the concept that the young birds will imprint on their home site and, at maturity, will return to it to lay eggs and rear young.

Including the first tower on Cobb Island, there are now nine such structures scattered throughout the Virginia barrier islands. The original Cobb Island site was used continuously from 1978 until 1981. In 1982, a pair of adult birds returned to the island but did not nest successfully. The reintroduction program has been further expanded during the past two years. Twenty-two falcons were released in 1981, 19 in 1982. Now, since 1978, 72 peregrines have been released. Of these, 64 fledged—a success rate of 89 percent.

Following dispersal, a young peregrine's natural death rate in the wild is probably 50 to 60 percent during its first year. The falcons do not breed until at least two years of age. Given these statistics, the Virginia releases should have resulted in some 14 adult peregrine falcons. The locations of 11 adults in the state are presently known; however, the birds may not all be products of the reintroduction effort in Virginia. Of these falcons, there are five pairs and one single adult.

Single adult and subadult peregrines began returning to the barrier-island towers as early as 1979, and mixed pairs of adults and subadults were observed in 1981. In 1982, three adult pairs —including the one on Cobb Island—returned to the towers. All three of these pairs displayed proper courtship behavior, but only one pair produced eggs. This falcon pair successfully fledged three young, the first time in over 20 years that peregrines had nested in the wild in Virginia. With this initial breeding success and the existence now of other adult pairs, the possibility of additional wild peregrine falcon hatchings in 1983 is greatly increased.

THE DELMARVA PENINSULA fox squirrel once ranged from central New Jersey and southeastern Pennsylvania southward through Delaware and into two Eastern Shore counties of

Virginia. The animals were never abundant in the Commonwealth. By the early 1900's, the squirrel had disappeared from New Jersey, Pennsylvania, and Virginia; it vanished from Delaware in the 1930's. Today, the species remains in only four counties in Maryland and in Accomack County, Virginia. It exists in Virginia only as the result of a successful translocation of animals in the early 1970's from Eastern Neck Wildlife Refuge, Maryland, to Chincoteague National Wildlife Refuge, Virginia.

Changing land-use patterns triggered the decline of the Delmarva fox squirrel. The animal is believed to prefer mixed stands of mature loblolly pine, with little or no understory, usually bordering streams or bays or farmlands. (Unlike its cousin, the gray squirrel, the fox squirrel spends much of its time on the ground, often ranging into open fields. This terrestrial affinity might explain the species' adaptation to more open, park-like forests.) As these mature woodlands were cleared for timber and agriculture, the fox squirrel's habitat dwindled. In some cases, cleared land was reforested; however, the new forests grew back with a dense understory up to the early sawtimber stage. Once these woodlands succeeded to the park-like environment preferred by fox squirrels, the trees were again harvested.

Because of its specific habitat requirements, the Delmarva fox squirrel is thought to have been widely scattered and discontinuous throughout its former range. The gray squirrel, much less exacting in its habitat needs, usually occurs with the Delmarva fox squirrel and probably possesses a competitive edge over it in marginal environments. Thus, the loss of preferred habitat and competition from highly adaptable and abundant gray squirrels are believed to have caused the disappearance of the Delmarva fox squirrel from most of its original range.

Fortunately, fox squirrels respond positively to management. When placed in suitable habitats, they are not disturbed by human activities. These factors have encouraged the members of the Delmarva Fox Squirrel Recovery Team—and others cooperating with the team's efforts—to reintroduce the species at Brownsville, mainland headquarters of the Conservancy's Virginia Coast Re-

Robert Noonan

Lighter in color than the gray squirrel—larger, shyer, and more deliberate in its movements—the nationally endangered Delmarva fox squirrel has been reintroduced at Brownsville, headquarters for the Conservancy's Virginia Coast Reserve.

W. Hassel Taylor

Virginia Coast Reserve Manager Rod Hennessey, flanked by Assistant Manager Barry Truitt, replenishes a fox-squirrel feeder at Brownsville.

serve. The team's intent is to extend the squirrel's range on Virginia's Eastern Shore.

In June 1982, 13 fox squirrels were transferred from the U.S. Fish and Wildlife Service's Chincoteague National Wildlife Refuge on Assateague Island to the isolated mature pine forests of Brownsville. Nature Conservancy personnel and staff from the Virginia Game Commission and the Chincoteague Refuge successfully trapped and transplanted the animals.

Some 45 nest boxes have been placed on trees at the Brownsville site to provide additional nesting cavities (a single fox squirrel may have up to four or five different nests) and also to monitor the status of the released animals. Since the '82 translocation, Conservancy personnel have kept watch over feeders and checked nest boxes on a weekly basis. There have been 11 sightings of the squirrels since December 1982. Stewardship plans for the squirrels at Brownsville also include habitat management, such as reducing the understory and planting supplementary natural foods.

It is too early to judge how the species is faring at its new release site or whether or not the transplant will "take hold"; but to date, fox squirrels do not appear to be using the nest boxes. Both Delmarva fox and gray squirrels have been observed at the feeders.

Another nine animals were released in the spring of 1983, just as this article was going to press. In light of this second and future transplants and the protected habitat offered by the Conservancy's Virginia Coast Reserve, members of the Delmarva Fox Squirrel Recovery Team are hopeful that the endangered squirrel will be successfully restored to its former range in the Commonwealth of Virginia.

Mitchell A. Byrd has been a professor of biology at the College of William and Mary for the past 26 years. In recent years, he has collaborated with the Virginia Commission of Game and Inland Fisheries on a number of endangered species studies, particularly that of the peregrine falcon.

Assistant non-game coordinator for the Virginia Commission of Game and Inland Fisheries, **Karen Terwilliger** has been closely involved with the Commission's Delmarva fox squirrel program.

Exotic Species Control: An Island Perspective

by Robert Alan Holt

MODERN MAN'S high mobility and the biological entourage of domestic and stowaway species that accompanies him on his travels have brought about the intrusion of exotic species in nearly every natural community around the world. This is particularly true in Hawaii, where the natural conditions that gave rise to the most unusual biota on Earth also permitted wholesale invasion by the foreign species arriving with man.

The remarkable plant and animal life of the Hawaiian Islands is chiefly the product of evolution in extreme isolation. Because 2,500 miles of salt water separate the islands from the nearest continent, the species colonizing Hawaii were limited to those that could fly, float, swim, or hitch-hike. The few plants and animals that reached the islands before the appearance of humans did *not* include large land mammals.

The isolation of the Hawaiian chain also slowed the rate at which colonists arrived: a popular estimate of vascular plants reaching the islands is one new taxon every 100,000 years. The plants that did flourish evolved in lands where competitors were few and herbivorous mammals were absent. Consequently, the vegetation gradually lost such protective features as needles and thorns, unpleasant scents, poisonous or foul-tasting chemicals, and resilient root systems.

Man's arrival dramatically changed the competitive environment in Hawaiian natural communities. *New* species were able to reach the islands at a much greater rate. Since Capt. Cook disembarked in 1778, Hawaii has received a new plant species on an average of once every five months. Suddenly large grazing animals—free for the most part from natural predators and diseases —roamed the Hawaiian landscape, eating and trampling the native flora. At the same time, herbivore-adapted introduced plants, themselves immune to many of the natural checks on their productivity, quickly invaded disturbed areas. Great expanses of Hawaii's vegetation, plus a wide array of its birds and invertebrates, have been lost to the disruptions caused by these introduced species.

FORTUNATELY, in endeavoring to maintain and restore remaining native ecosystems, the Hawaiian land steward is aided by three factors. First, disturbances to the environment are relatively recent, especially in rugged locations where endemic plant communities still predominate. (On the island of Maui, for example, large tracts of land were free of feral pigs until as recently as the 1970's.) Since the natural systems in such areas have not yet been severely unbalanced, there is still a great deal of the "original Hawaii" left to save.

Second, in many cases damaged Hawaiian ecosystems have recovered well once exotics like deer and feral pigs and goats have been removed. To regulate these species, the Conservancy is using fencing in strategic areas and allowing hunters greater access to its forest preserves where appropriate.

Third, undisturbed native ecosystems are generally resistant to invasion by the majority of foreign species. Such areas are so densely vegetated that most exotic plants, insects, and small mammals cannot gain a foothold. The Conservancy is protecting these pristine sites by focusing its management efforts on controlling large herbivores as well as other direct disturbances, such as road construction and clearing.

There are, however, several foreign species that can supplant native species with little help from the introduced herbivores. *Clidemia hirta* is a shrub from Central America that has overwhelmed Hawaiian understory plants throughout much of Oahu's rain forests. Weeding by hand can keep *Clidemia* in check only in small, localized outbreaks; biological control may be the only long term hope for arresting this aggressive plant. Several insect control agents imported by Hawaii's

Walt Matia

Conservancy Preserve Manager Ed Misaki surveys the damage feral pigs have done to vegetation at Kamakou Preserve on Molokai. Because life on the Hawaiian Islands evolved in the absence of such mammals, their introduction has been ecologically disruptive.

Department of Agriculture from *Clidemia*'s native habitat have been released on a very limited basis. (Biological control agents are heavily tested to ensure that they are host specific.) Although the insects have had some effect, further research and perhaps more experimental introductions are necessary. Several other exotic plants, such as banana poka and blackberry, may also call for biological control methods.

Among non-native invertebrates, the carnivorous snail *Euglandina rosea* has significantly reduced endemic land snail populations on several islands. And the introduced yellow jacket, *Vespula pennsylvanica,* apparently feeds on Hawaiian insects, especially butterflies and moths and Hawaii's large fruit flies. The Conservancy will encourage research, by state and federal agencies and universities, on controlling these predatory species.

Some disruptions caused by exotic species are more difficult to detect and, thus, to regulate. For example, avian malaria and avian pox—as well as predation by cats, rats, and mongooses—have been regarded as major causes of extinction of the islands' forest birds since 1800. (There are more endangered birds—21—in the Hawaiian archipelago than in any other area of similar size on Earth.) But the actual extent of the threats is poorly understood, and methods to control the problems are yet to be developed. The U.S. Fish and Wildlife Service and the National Park Service are researching techniques for restraining both the extant populations of predators and their spread to other areas. At the same time, studies of avian malaria indicate that native bird habitats must be kept free of introduced mosquitoes (carriers of the disease). This means limiting standing water by controlling feral pig damage to the forest floor.

NOWHERE ELSE in the United States are as many native species facing possible extinction in the decade ahead as in the Hawaiian Islands. And it is unlikely that the problem of exotic species will ever be conquered here. However, given the findings of ongoing research and the resiliency of Hawaii's native ecosystems, we will learn to curb the rate of new introductions and to arrest the disturbances they cause. Hawaii's unique plant and animal life is dependent on our efforts.

Robert Alan Holt is the Conservancy's land steward for Hawaii.

ECOLOGY FORUM

No. 49
by Walt Matia
Vice President for Stewardship

TOWARD A SUSTAINABLE STEWARDSHIP PROGRAM

Nearly 30 years ago, a group of naturalists and concerned citizens joined together to protect New York's Mianus River Gorge. In the first flush of success, they purchased 60 acres and became The Nature Conservancy's original land stewards. Acquiring adjacent parcels year by year, deed by deed, the Mianus River Gorge Committee has extended the preserve by 345 acres (the most recent addition having been made in 1982). The stewardship responsibility has also grown incrementally. But what was true when the first parcel was signed into Conservancy ownership is still true: the land is not secure from all ecological and political threats, nor will it be in 30 years. Its long-term welfare depends upon sensitive, vigilant management —a commitment that begins with our earliest protection decisions and does not end.

Today, the Conservancy is responsible for the largest privately owned system of nature sanctuaries in the world, some 700 preserves encompassing more than half a million acres in 48 states. Our management obligation has grown in huge bounds as well as studied steps. For example, with the acquisition of 24,000-acre Katharine Ordway Sycan Marsh in 1980, the Oregon Field Office took responsibility for more land in a single transaction than some of the oldest, most active Conservancy chapters had acquired in their entire histories. Furthermore, the marsh came encumbered with a grazing lease that would not terminate for 40 years. Until then (when the Mianus River Gorge Committee is celebrating its 66th anniversary on the other side of the continent), the preserve manager at Sycan Marsh will be working with the lease-holder to make sure that the grazing is compatible with the stewardship needs of the area's natural communities.

The Conservancy establishes some 35 new preserves each year. (Our many other conservation projects include areas that cooperating agencies oversee and additions to existing Conservancy sanctuaries.) Like Sycan, many of these are bigger than the older preserves—and/or come into our ownership with existing management programs (such as grazing, haying, timber harvest, and mineral extraction) that were virtually unknown on our lands a few years ago. Stewardship, from Mianus to Sycan, is an increasingly complex business.

It is also a diverse business, involving a wide-ranging set of tasks: assessing a new project site to see if the species or ecosystem of concern can actually be protected there; preparing for the prescribed burning of prairie tracts; reviewing fencing plans; designing research projects; planning and budgeting; making day-to-day repairs, posting signs, filing documents, and meeting the many other time-consuming obligations of a landowner.

With hundreds of thousands of acres under our care and so much at stake, there are innumerable decisions to be made—year after year after year. How do we determine what to do, and when to do nothing at all? What is the best means (ecologically, programmatically, financially) to manage our preserves, realizing that stewardship successes are measured in short-term victories, not permanent protection, and losses not merely in dollars but in species and living communities?

Stewardship successes are measured in short-term victories, not permanent protection, and losses not merely in dollars but in species and living communities.

In the face of an overwhelming variety of environmental issues and potential problems, the Conservancy as a whole has specialized. We have

concentrated our efforts on the protection of a very small percentage of the total number of species and ecosystems, and on an even smaller percentage of the total landscape. By identifying the most highly jeopardized "elements" of natural diversity —those plants, animals, and communities that are of particular interest because they are exemplary, unique, or endangered on a statewide or national basis—the Conservancy has been able to focus its land protection program in this country. Using the same unifying principle, it is now focusing its stewardship program.

In 1982, we made the decision to concentrate our efforts on the management needs of the very

Today we are actively building a strong team of ecologists, zoologists, and botanists . . . to keep the biological currency in our trust abundant and safe.

elements for which our preserves were created—in effect, to define "stewardship" in terms of biological management rather than land management. This new policy brings with it guidelines by which a multitude of disparate stewardship decisions can be made.

The targeting of stewardship objectives on sustaining elements of natural diversity that are demonstrably rare *and* in need of management, is changing the structure of our stewardship program. Only a few years ago, the Conservancy's preserve management staff was skeletal. Once a preserve was created, the overriding concern of its stewards (usually local volunteers) was to direct its use—for research, education, recreation. . . . The preserve took on a life of its own, often with goals that did not complement the efforts of the Conservancy's state and national programs.

Today we are actively building a strong team of ecologists, zoologists, and botanists on our preserves and in our state and regional offices—assembling the necessary talent to keep the biological currency in our trust abundant and safe. This scientific work force is gaining a national reputation for developing and documenting effective management procedures. Conservancy stewards contribute regularly to national technical and scientific journals and frequently sponsor regional conferences on the management of rare and endangered elements. They identify gaps in our management knowledge, suggest ways to bridge those gaps, and determine what actions we should take. However rigorous the scientific justification for such decisions, the homely rule is, "if it ain't broke, don't fix it." And if it is "broke"—don't overdo the repair job, but don't neglect it. The Conservancy can afford neither.

With the shift to element management, stewardship *planning* has evolved. Conservancy field offices are now able to look at the big picture: to consider the protected elements on all preserves within a state and draft statewide stewardship plans based upon their comparative endangerment. These plans mirror the priorities set by the Conservancy's "natural diversity scorecards"—reports that rank the individual elements of diversity according to their need for protection. The state scorecards have refined the Conservancy's identification efforts, and the statewide stewardship plans are refining our stewardship efforts. Just as we have inventoried special species and communities state by state and ranked their significance, we are now inventorying and ranking management needs. The critical next step is to line up the stewardship skills to get the job done.

Finally, by emphasizing the management of elements rather than natural areas *per se,* we have better defined our stewardship mission and fine-tuned our efforts accordingly. The result is a stewardship program that holds itself accountable, state by state and nationally, by keeping its priorities clear. We can now chart our long-term plans and calculate more accurately what funds, staff, and volunteer resources we'll need to meet them. To state it simply, we've begun to shape a sustainable stewardship program for the living communities in our care.

FALL TOUR OFFERED: ADIRONDACK MOUNTAINS

Covering 9,000 square miles in northern New York, the Adirondack Park is the largest protected sanctuary in the continental U.S. Over 2½ million acres of the park are protected as "forever wild."

The Adirondack tour offers Conservancy members and their guests the chance to visit the Park on the weekend of September 23 to 25, 1983. You will learn about the role the Adirondack Conservancy has played in preserving this vast wilderness, and stay at the famous and historic Ausable Club, which owns and protects over 7,000 acres in the heart of the high peaks region of the Adirondacks. The cost of the trip is $149.00. Don't miss this visit to "the land that nobody knows."

For details, write to Adirondack Fall Tour, c/o Travelworld, 1500 Wilson Boulevard, Arlington, Virginia 22209 or call (703) 525-3605. Space is limited.

NEW PROJECTS

COLORADO

Hoosier Ridge (Park County). Owing to its diminutive size (individuals are one to two inches tall) and its exacting habitat requirements, *Braya humilis* ssp *ventosa* is maddeningly hard to find. This herbaceous perennial plant, first described in 1950, is known to occur at only three sites in the world. The Conservancy has purchased surface rights on one: a four-acre central Colorado plot of sloping alpine tundra. High on the Colorado Natural Heritage Program's list of protection recommendations, the tract bears small, moist depressions in which the rare plants thrive. The Colorado Field Office, which manages the area, has embarked upon an $18,000 fund-raising campaign to cover costs and establish a stewardship endowment.

FLORIDA

Lower Escambia River (Escambia and Santa Rosa Counties). This is the inaugural project of the Conservancy's National Wetlands Conservation Project, an ambitious new undertaking spurred by a $25-million Richard King Mellon Foundation grant. The Conservancy has purchased a 9,976-acre expanse—bottomland hardwood forests, saltwater and freshwater marshes along the Lower Escambia River—from the St. Regis Paper Company. This initial parcel in a projected 17,000-acre assemblage will be repurchased by the Northwest Florida Water Management District with funds from the state's "Save Our Rivers" program. A prototype of successful cooperation between the public and private sectors, the Escambia project will protect an 18-mile stretch of river corridor critical to the continued vitality of the Escambia Bay's fisheries.

ILLINOIS

Lower Cache River—Addition—(Pulaski County). It looks like Louisiana—a mazy expanse of swamps and sloughs with stands of huge bald cypress trees (many over 1,000 years old) and tupelos—but it's southern Illinois. A six-mile stretch of land along the river, of which this recently purchased 60-acre addition is part, was recommended for protection by the Illinois Natural Areas Inventory. Now 262 acres in all, Conservancy lands here boast the second largest bald cypress tree in the nation, rare herbs and shrubs, breeding grounds for green tree frogs, and nesting grounds for migratory waterfowl. Thanks go to the Amoco Foundation for its $60,000 grant to the project. The Illinois Field Office is responsible for management.

MARYLAND

Nassawango Creek—Addition—(Worcester County). An untrammeled vestige of the towering cypress forests that greeted the first settlers, Nassawango Creek Preserve lies along a tributary of the Pocomoke River on Maryland's Eastern Shore. With the recent purchase of a 585-acre property, Conservancy protected acreage here totals 2,328. Seventeen species of colorful warblers, as well as wood ducks and pileated woodpeckers, thrive along the stream—as do numerous mammals, including river otters, minks, gray foxes, opossums, weasels, and flying squirrels. The Maryland-Delaware Field Office, which manage the preserve, has its sights set on a completed assemblage of 2,500 acres along 15 miles of Nassawango Creek.

MINNESOTA

Straight River Wildflower Preserve (Rice County). Minnesota's only endemic plant species, the dwarf trout lily (*Erythronium propullens*), is choosy about habitat. The flower is found on north-facing valley slopes in the southeastern corner of the state—and nowhere else on Earth. With the purchase of 36 acres (and receipt of a 50 percent undivided interest in 16-acre Paul Weaver Wood Bluff Preserve from Margaret Weaver), the Minnesota Chapter has safeguarded more than forty colonies of these botanical celebrities. River Bend Nature Center, which manages some 200 acres of parkland abutting these tracts, will lease the land for management while a stewardship plan for the lily colonies is being developed.

Twin Valley Prairie—Addition—(Norman County). Purchase of a 19-acre native prairie tract brings the northwestern Minnesota preserve to 259 acres. Riding a beach ridge of an ancient glacial lake (Lake Agassiz), the preserve's mosaic of mesic, wet-mesic, and wet prairie communities is flanked by sedge meadows and marshlands. Dakota skipper butterflies, prairie voles, yellow rails, greater prairie chickens, and marbled godwits—all ranked as "special animals" by the Minnesota Nat-

George Fenwick

Delmarva Bays

Puzzling in origin, diverse in flora, restricted in range—Delmarva bays are small, pond-like acidic wetlands whose waters rise and fall with the seasons. The Conservancy is energetically pursuing their protection within its enterprising Maryland Natural Areas Campaign: a drive to raise $1.2 million by December of 1985 to protect examples of the state's rarest natural systems, from the Appalachian Mountains to the coastal plain. The recent purchase of a 30-acre property near the Delaware border secures Conservancy protection for a third bay or "pothole" in Maryland; the Maryland-Delaware Field Office protected two others in 1982.

Fluctuating water levels in these clay-based depressions have fostered the growth of uncommon glade and shrub-swamp communities. Some of the associated plant species have adapted so well to the cycle of flooding and drying that they can withstand extremes on either end for years at a time. Another botanically intriguing feature is the presence at half the known bays of floating sphagnum moss, a bog-loving species.

Rainfall and evaporation, rainfall again—these are the events that affect Delmarva bays. Averaging three acres in area, though some are as large as ten, these wetlands exist only within a 50-mile radius on the Delmarva (named for Delaware, Maryland, and Virginia) Peninsula. They're nothing new: some scientists trace the bays back 50,000 years—to the last retreat of sea waters from the coastal plain.

Ecologically, Delmarva bays are "island" habitats in which peculiar conditions support species and communities uncharacteristic of the surrounding landscape. A case in point is the disjunct population of carpenter frogs (*Rana virgatipes*) at the newly acquired site—now safe thanks to the identification efforts of the Maryland Natural Heritage Program and timely protection by the Maryland-Delaware Field Office.

ural Heritage Program—are among the site's uncommon species. The Minnesota Chapter, which is responsible for management, must raise $11,900 for the project.

OREGON

Downey Lake (Wallowa County). Set into a grassy ridge against the backdrop of the Wallowa Mountains, a recently purchased mid-elevation spring-fed lake is the only protected aquatic system of its kind in eastern Oregon. Three grassland communities of note exist here: tufted hairgrass montane meadow, barley-spike/rush-sedge wetland, and Idaho fescue-junegrass. The property hosts blue-winged and cinnamon teals, black terns, horned grebes, yellowlegs, and other migrating waterfowl and shorebirds, as well as a variety of raptors. The Oregon Field Office, which manages the new preserve with technical assistance from the Oregon Department of Fish and Wildlife, is working to raise $75,650 to cover the purchase price and establish a stewardship endowment. Downey Lake is a project of the Conservancy's far-reaching National Critical Areas Conservation Program (set in motion in 1981 by a $10-million Goodhill Foundation challenge grant) and the Oregon Critical Areas Program.

VERMONT

Silvermine Fern Colony (Rutland County). Sequestered in the micro-climate of a "frost hole" or cold-air basin, two rare ferns (*Dryopteris filix-mas* and *Dryopteris filix-mas* x *marginalis*) are thriving in numbers. A gift of land from Perry McEdward, the property hosts these and other plant species at an uncharacteristic altitude and latitude. The Vermont Field Office manages the new preserve, one of only three sites in the state for the ferns. (See page 17 for photograph and a description of management practices at Silvermine.)

VOLUNTARY PROTECTION

As the *News* has frequently noted in recent years, the Conservancy advocates the protection of significant lands through alternatives to outright acquisition. Natural area registry programs—established by the Conservancy and cooperating agencies in several states—serve to notify landowners of outstanding ecological features on their properties. Through such programs, private, corporate, and public landholders have agreed to protect vital resources. The following areas were recently safeguarded in this fashion through the Conservancy's efforts:

INDIANA

Black Rock, .5 acre
Goose Pond, 543 acres
Green's Bluff, 65 acres
Otis Allyn Cypress Slough, 40 acres

IOWA

Bird Birch Grove, 20 acres
Black Hawk Bottoms, 930 acres
Dahms Prairie/Grant Center, 1,840 acres
Dubuque Prairie, 80 acres
Eight Acre Prairie, 8 acres
Hoffman Prairie, 23 acres
Jackson Aconitum, 191 acres
Johnson Prairie, 40 acres
Joy Creek Bluffs, 52 acres
Knob Prairie, 38 acres
Marion Springs, .1 acre
Peltranda Site, 7 acres
Runyan Prairie, 6 acres
Sand Cove, 21 acres
Sand Creek, 46 acres
Trenton Sand Prairie, 10 acres
Wright Woods, 136 acres

MARYLAND

Bowen's Woods, .1 acre
Buzzard Branch, 3 acres
Cave in the Field, 1 acre
Charlestown Beach, .75 acre
Charlestown Wharf, 1 acre
Clay Point Beach, .3 acre
Steven Collins Woods, 17 acres
Lover's Leap, 3 acres
Perryville Park, 2 acres
Plum Creek Swamp, 50 acres
Wolf Swamp, 20 acres

WEST VIRGINIA

Martha's Cave, .5 acre

Free Money?

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For further information, please contact Ray M. Culter, Director of Trade Lands, The Nature Conservancy, 1800 N. Kent Street, Arlington, Virginia 22209; (703) 841-5351.

From time to time, The Nature Conservancy exchanges membership lists with other conservation organizations whose work might also interest you. In this way, we are able to increase the Conservancy's membership at a lower cost than would otherwise be possible. However, if you prefer *not* to receive these mailings from other organizations, please attach the mailing label from this magazine (or copy the label *exactly*) and mail it to:

Membership Secretary
The Nature Conservancy
1800 North Kent Street
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Join us this summer and explore the Conservancy's extraordinary Pine Butte Swamp Preserve—spectacular surroundings for riding, hiking, fishing, photography, birdwatching . . . or just relaxing.

Al and Sally Haas invite you to stay at a unique dude ranch in the heart of Montana's Rocky Mountain Front. For more information, contact the Circle 8 Ranch, P.O. Box 457, Choteau, Montana 59422/(406) 466-5564.

COTTAGES AVAILABLE AT MILE HI

Modern housekeeping cottages overlooking a mountain creek are available for rental year-round at the Conservancy's Mile Hi Preserve. Located 90 miles southeast of Tucson in the Huachuca Mountains, the Mile Hi stretches across the mouth of Ramsey Canyon, one of the most lovely and biologically diverse canyons in southern Arizona. To arrange a visit or obtain a brochure and birdlist, write: The Mile Hi, RR 1, Box 84E, Hereford, Arizona 85615. Phone: (602) 378-2785.

VISIT DOG ISLAND

It's a pristine barrier island 20 miles off Florida's Gulf Coast—and you're invited! The Conservancy owns 75 percent of 1,800-acre Dog Island at the eastern end of Apalachicola Bay. Its beaches offer the finest shelling in the state, and there are countless other recreational opportunities. Eight modern apartment units are available for rental. For more information write to Mr. Dan Tonsmeire, c/o The Pelican Club, P.O. Box 301, Carrabelle, Florida 32322, or call (904) 697-2839. Conservancy members will receive special consideration.

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Through your will, you have the power to determine how your estate will be distributed. If you do not have a will, the state decides.

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A bequest to the Conservancy is a living legacy, protecting significant natural areas—and the plant and animal life that depends on them—for future generations.

For information in full confidence about including a bequest to The Nature Conservancy in your will, or for sample bequest language for review by you and your attorney, please contact:

Alice A. Pinsley
Director of Planned Giving
The Nature Conservancy
294 Washington Street
Boston, Massachusetts 02108
617/338-2103

Estate planning under the new tax laws can also result in a significant reduction in gift and estate tax. If you are interested in receiving a new brochure, "Your Will: New Tax Law Strategies," by prominent tax attorney Conrad Teitell, please contact Alice Pinsley at the above address.

NEXT IN THE NEWS:

MIGRATION

The September/October issue brings you the greatest show on Earth: migration. Read about the formidable journeys of green turtles, sandhill cranes, monarch butterflies. Find out what the Conservancy is doing to "be there" at key stations along the way—next in the *News*.

NEW LIFE MEMBERS

An individual becomes a Life Member of The Nature Conservancy upon contribution of $1,000 for membership dues or for the Land Preservation Fund, Guarantee & Income Fund, or a State Land Preservation Fund. Husbands and wives may hold a joint life membership for a single qualifying contribution.

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